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WASTEWATER ENGINEERING AND MANAGEMENT PLAN FOR BOSTON HARBOR-EA--ETC(U)  
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**WASTEWATER ENGINEERING  
AND MANAGEMENT PLAN**

**FOR**

**BOSTON HARBOR - EASTERN MASSACHUSETTS METROPOLITAN AREA**

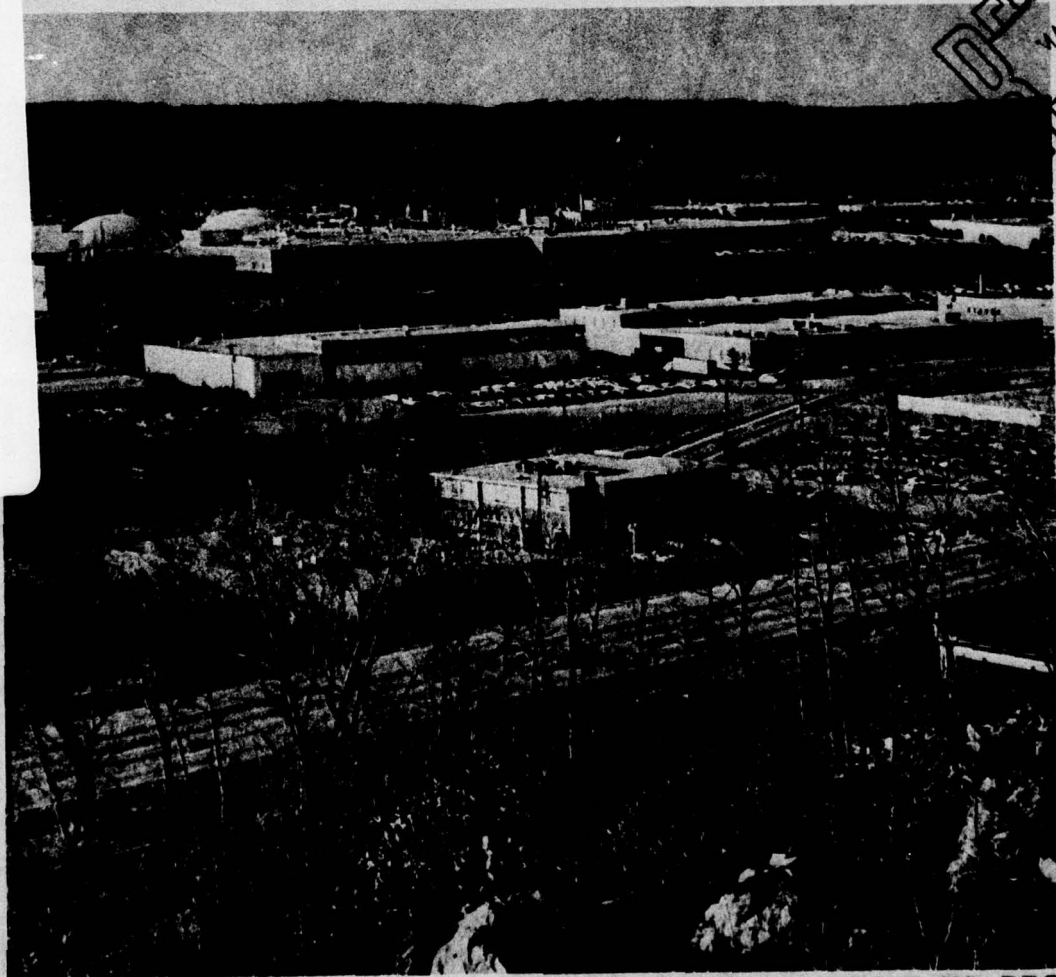
**EMMA STUDY**

**TECHNICAL DATA VOL. 3**

**INDUSTRIAL PROCESS**

**WASTEWATER ANALYSIS AND REGULATION**

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### COVER PHOTOGRAPH

The cover photograph on this Technical Data Volume depicts the Waltham Industrial Park along Route 128 in Waltham.



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**WASTEWATER ENGINEERING  
AND MANAGEMENT PLAN  
FOR  
BOSTON HARBOR - EASTERN MASSACHUSETTS METROPOLITAN AREA  
EMMA STUDY.**

**TECHNICAL DATA ~~16~~ *ume 3.*  
INDUSTRIAL PROCESS WASTEWATER ANALYSIS  
AND REGULATION.**

**FOR THE  
METROPOLITAN DISTRICT COMMISSION**

**COMMONWEALTH OF MASSACHUSETTS**

**BY**

**METCALF & EDDY, INC.**

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REPORT

## CHAPTER 1

### INTRODUCTION

#### Purpose

→ The purpose of this Technical Data Volume is to develop and present the formulation of updated rules and regulations for industrial wastes discharged to the Boston Metropolitan District Sewerage system which will conform to current Federal and State requirements, with enough flexibility for adaptation to future changes.

↓ A review of current legislation on the basis of charges for wastewater disposal is included to insure compliance with Federal and State requirements, including industrial cost recovery of Federal grants.

#### Report Structure

As shown on the inside cover, the study results are presented in a series of volumes.

This report is Technical Data Vol. 3, Industrial Process Wastewater Analysis and Regulation and presents proposed changes in the Metropolitan District Commission (MDC) rules, regulations and basis for service charges.

Appendix A presents a proposed 1975 update of the rules and regulations covering discharge to the MDC Sewerage System.

Also included, as Appendix B, are excerpts from the report that was prepared as a result of the Industrial Waste Survey conducted for this study. This survey was conducted to identify the major industrial waste dischargers in the MDC system.

Appendix G presents sections of Chapter 92, Massachusetts General Laws, applicable to the Metropolitan Sewer District and includes amendments passed on December 22, 1975, entitled, An Act Providing for the Assessment of Sewer Use Charges to Meet Capital and Operating Expenses of the Metropolitan District Commission and for Other Purposes.



## Background

The Metropolitan Sewerage District was established in 1889 and the original system completed in 1895. A few years later the South Metropolitan System was added and in 1945 the Nut Island Treatment Plant was authorized and funded in the amount of \$15,000,000 with a capacity of 112 million gallons per day (mgd). In 1951 the Boston Main Drainage District was included in the Metropolitan System and a major improvement program was funded with an additional \$50,000,000. The program included a 343 mgd treatment plant at Deer Island with deep rock tunnel connections.

From 1901 to 1945 assessments for Metropolitan sewerage construction costs were based on the state tax apportionments of each of the District's cities and towns served. These were revised about every three years. From 1945 to 1959 the 1945 apportionment figures were used, although they had long been obsolete and inequitable. Since 1959 the North and South Systems have been combined and the funds borrowed by the state through bond issues are reimbursed by the 43 cities and towns served through annual payments of principal and interest apportioned on the basis of size of connection with flow estimated at a velocity of 2 feet per second. New or relief sewers are charged directly to the cities and towns in proportion to the benefits received in terms of capacity made available.

On December 22, 1975 legislation was passed to again modify sections of Chapter 92 of the General Laws. This legislation is intended to conform the MDC practices to the EPA requirements for grants for the construction of treatment works under the Federal Water Pollution Control Act, Amendments of 1972. In addition, it is intended to conform to the "Massachusetts Clean Waters Act" and the "Rules and Regulations for the Establishment of Minimum Water Quality Standards and for the Protection of the Quality and Value of Water Resources" as promulgated by the Massachusetts Water Resources Commission, Division of Water Pollution Control in 1974, and all applicable State water pollution control laws.

Key provisions are briefly reviewed here as follows:

Apportionment of principal and interest requirements for each fiscal year on debt incurred for the Metropolitan Sewerage System shall be based on the respective populations of member cities and towns as ascertained by the last preceding State

census, and on the population equivalents of the industrial wastes contributed to the Metropolitan Sewerage System by the respective cities and towns, as determined by the Commission.

Annual operating and maintenance costs are to be divided among the cities and towns in proportion to their respective populations contributing to the system and on the population equivalents of other wastes contributed to the system, as determined by the Commission.

This legislation also provides for industrial cost recovery in accordance with the provisions of Federal law with respect to any Federal grant for the construction of treatment works. Apportionment of the Federal share of costs to be recovered from cities and towns serviced shall be in accordance with the population equivalents of their industrial wastes discharged to the Metropolitan Sewerage System.

Costs for construction of extensions to provide service for additional cities and towns or to provide additional service for one or more cities and towns shall be paid by the cities and towns so benefitted in proportion to the respective additional capacities made available to them.

Also included in this legislation is authorization for the Commission to require municipal, industrial and other users to comply with Federal and State laws including pretreatment standards; monitoring, record-keeping and reporting of discharges to the system; notification of changes; user charges and industrial cost recoveries. The Commission may inspect and sample users and may issue orders and impose fines on violators in addition to fines authorized under earlier legislation.

The Commission is required to distribute all costs in accordance with the above requirements, must adopt regulations and may assist cities and towns in developing ordinances and user charges.



## CHAPTER 2

### RULES AND REGULATIONS

#### General

The MDC Commission is authorized by applicable sections of Chapter 92 of the General Laws and further required by Chapter 705 of the Acts of 1945 to establish rules and regulations relative to the discharge of sewage and industrial wastes to its system, and to modify and update such rules and regulations from time to time. A draft of a proposed update of the rules and regulations is attached as Appendix A.

The rules and regulations now in effect were updated in 1971 utilizing the Manual of Practice No. 3 on the "Regulation of Sewer Use" prepared by a Committee of the Water Pollution Control Federation in 1963. This manual was updated in 1975, and has been used in preparation of the proposed rules and regulations as now amended. In addition, these rules and regulations have been designed to conform to the 1972 Amendment to the "Federal Water Pollution Control Act", the Massachusetts Clean Waters Act and related water pollution control laws and the 1974 "Rules and Regulations for the Establishment of Minimum Water Quality Standards" of the Massachusetts Division of Water Pollution Control and for the Protection of the Quality and Value of Water Resources.

In analyzing these revisions, it was not considered appropriate to restrict the changes to the industrial waste problem, but rather to include such changes as part of an overall update.

The basic philosophy in preparing these rules and regulations with reference to industrial wastes has been to adopt a realistic and reasonable approach to the accomplishment of the objectives of the Federal and State requirements. The aim is to accomplish the control of water quality with a minimum of tests and reports from the communities and industries and a reasonable program of inspection and testing by the Commission in the interests of economy. This requires the full cooperation of the industries involved in providing adequate self-monitoring and control to insure full compliance with water quality guidelines of Federal and State agencies, and in maintaining the standards designated for the receiving waters so as to upgrade the environmental quality of the region.



### Impact of Federal Requirements

The Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) set broad policies and the EPA has prepared very extensive guidelines for implementing these policies. It is intended that recommended MDC rules and regulations shall conform to these guidelines, and their future amplification and modification.

The Act and these guidelines identify specific toxic wastes that are prohibited from being discharged.

They specify that certain less objectionable wastes not removed by the District's treatment plants may be discharged after their pollutorial load has been reduced to the lowest level attainable through the application of the best practical control technology currently available.

They require each industry discharging or proposing to discharge certain prescribed wastes to obtain a permit which specifies appropriate limitations on, and conditions for, such waste discharges as are proposed. These industries must furnish an annual report on their waste discharges, and provide for measurement and control of waste discharges as prescribed.

They require cost recovery procedures for works financed by Federal grants which will be discussed later.

### Impact of State Requirements

The State Division of Water Pollution Control has the following powers and duties:

Adopts standards of water quality for the receiving waters of the Commonwealth.

Examines periodically the water quality of coastal waters and other receiving waters.

Prepares and keeps current a comprehensive plan for pollution abatement.

Adopts rules and regulations for the administration of the laws relative to water pollution.

Requires submission of reports and plans of abatement facilities for approval and inspects construction thereof.

Authorizes financial assistance from the State and coordinates Federal grant applications.

Supervises operation and maintenance of facilities of the District.

Issues permits for the discharge of sewage or industrial wastes.

Enforces conformance with its standards of water quality by written order, subject to a hearing if requested and subject to judicial review by the superior court.

Controls handling and disposal of chemical and other hazardous wastes.

From this list of pertinent duties of the Division of Water Pollution Control, it is apparent that certain rules and regulations of the Commission must conform to the requirements of the Division, which is responsible for those operations. The Division in turn must operate within applicable Federal guidelines established and maintained by the EPA. Also, of special interest are the Division's responsibilities for financing projects which require State and Federal funding.

## CHAPTER 3

### BASIS FOR WASTEWATER SERVICE CHARGES

There are two basic approaches to apportioning costs of wastewater systems. One is to attempt to collect from communities the actual costs incurred in handling their wastes. In a large metropolitan district such as the MDC, costs for various communities could vary widely depending on the distance from the treatment works, and the degree of treatment provided at the plant serving an individual community.

The second approach is to collect from users equal fees for equal service regardless of how far the sewage is transported or what degree of treatment may be required at a particular treatment works serving a given community.

Historically, the MDC has used the second approach for both its water rates and sewer service charges. The District was formed so that all the communities could share costs and benefits of the entire system as a single unit.

The financing of wastewater systems has been under study for many years by the leading engineering societies concerned. The latest report on the subject was issued by a Joint Committee of the American Public Works Association, American Society of Civil Engineers, and Water Pollution Control Federation in 1973.\* Procedures for establishing fair rates and charges, including allocation of costs in proportion to benefits and use are discussed in detail. In line with these procedures, and utilizing Technical Data Vol. 12, Financing and Management, prepared by Peat, Marwick, Mitchell & Company, with certain changes, a recommended procedure for determining rates and charges is presented here.

#### Recovery of Capital Costs

Historically, the State has authorized bond issues for major improvements in the MDC sewerage system. The debt service on the bonds has been reimbursed to the State by the cities and towns. It is recommended that this practice be continued with some changes in the basis for collecting the funds for debt services.

\*Financing and Charges for Wastewater Systems, A Joint Committee Report of the American Public Works Association, American Society of Civil Engineers and Water Pollution Control Federation, 1973.



Water Use as a Basis for Charges. A widely accepted method of allocating charges for sewerage service is on the basis of metered water use with allowance for water not returned to sewers. This appears to be an equitable method of apportioning among the various users the charges for plant capacity used in that it is based on service provided. In this way, benefits from conservation practices go to the actual user. The cities and towns can in this way collect the funds with their water bills to residents. For domestic users, major uses of water not returned to the sewers can be eliminated by basing water use on the rate of use during the winter quarter. Similarly, cases where water is not metered can be handled by exception or a meter can be installed where necessary. Discharges originating from private water sources can be required to meter such discharges. These latter two conditions are not common practice in the MDC area, and where such do occur, they generally involve industries.

For simplicity during the interim stages of implementation, apportionment of costs for nonindustrial discharges could be approximated by population (as directed by the 1975 Legislation). This would, however, favor communities where commercial, institutional and other similar activities are a larger proportion of the domestic water use than is normal. On the other hand, it would be a fair apportionment in cases where a present MDC member community is not fully sewered, but where capacity is being allocated for such future service.

Property Taxes as a Source of Charges for Excess Capacity. Inasmuch as the excess capacity provided in a system can be considered as increasing the value of the property served and to be served in the future, it can be argued that the property owner should bear this portion of the system costs in proportion to the property value. These costs would be apportioned among the cities and towns in proportion to their equalized assessed valuation, and would be collected as part of the property tax. As use increases, the excess capacity decreases, so as the years go by, more of the costs would be collected from users and less from properties.

Since the MDC present service area is already well developed, excess capacity allocatable costs are not considered significant and a procedure to explicitly identify and apportion such is not considered necessary.

Extensions Charged to Communities Served on the Basis of Capacity Provided. The debt service on the cost of future system extensions required should be paid for by the communities served on the basis of the capacity provided for each community. Similarly, relief sewers constructed would be paid for by the communities served in proportion to the design capacity provided for each. This exception to the general approach of equal charges for equal service seems justified at this time.

Surcharges. As required by the 1975 Legislation, industries which put a special load on the treatment facilities thereby affecting the cost of constructing such facilities should be expected to pay proportionally more than the average rate for normal domestic sewage. The two most common elements which impose a higher loading which affects the treatment plant capacity in addition to flow are suspended solids (SS) and biochemical oxygen demand (BOD). The first imposes a special load on the sedimentation tanks (primary treatment) and solids disposal works and the second imposes a load on the secondary treatment processes and solids disposal facilities.

Although the unit costs for each of these elements can readily be determined for a given treatment plant, (see Technical Data Vol. 15 for preliminary estimates) the costs of measuring the quantities produced by a given industry can be high. As a practical matter, only industrial wastes contributions that significantly affect costs can be economically monitored and charged for these excessive elements. Limits for total flow, average quantities of suspended solids and BOD should be set, below which the industrial wastes would be accepted on the basis of measured flow.

The industrial wastes survey, conducted as part of the EMMA Project, identified major industries contributing process wastes to the municipal sewer systems. The number having large quantities of strong wastes may be seen as summarized in Table 3-1 below.

TABLE 3-1. SUMMARY OF DATA ON MAJOR INDUSTRIES

	Firms exceeding (gpd)(1)		
	50,000	500,000	1,000,000
Number of industries	101	14	6
<u>BOD</u>			
Exceeding 300 mg/L <sup>(2)</sup>	33	8	3
Exceeding 500 mg/L	27	7	2
Exceeding 1,000 mg/L	14	2	1
Exceeding 2,000 mg/L	5		
<u>Suspended solids</u>			
Exceeding 100 mg/L	48	10	5
Exceeding 200 mg/L	29	8	4
Exceeding 400 mg/L	17	4	1
Exceeding 1,000 mg/L	4		
Exceeding 2,000 mg/L	3		

1. Gallons per day.
2. Milligrams per liter.

MDC Control of Major Industrial Waste Contributors.  
 In order to provide centralized control and uniform procedures in handling industrial wastes with high suspended solids and/or BOD, it is proposed that the MDC be prepared to aid municipalities in billing major industrial waste contributors in this category. These industries would be shown separated from the contributions by the cities and towns. Other, minor industrial waste contributors would be based on water consumption alone. Industrial customers who have significant uses not returned to the sewer system could arrange for the use of "exclusion meters" to record such uses, so they would get an appropriate deduction from their total metered water use. Similarly, such customers with private sources of supply would be required to install meters on such supplies.



Industrial Cost Recovery. The Federal Water Pollution Control Act (92-500) as amended in 1972 requires that private industry pay back their share of the cost of Federally funded sewerage works. The EPA is responsible for guidelines needed to implement this requirement. Accordingly, the procedure recommended in the preceding paragraphs must be tailored to meet the EPA guidelines, and worked out with local EPA officials in a manner acceptable to them. The dividing line in determining industries that are subject to surcharges should be the same as that for industrial cost recovery and in both cases must be tested against all factors which significantly influence the cost of the treatment works, including strength, volume, and flow characteristics.

#### Recovery of Operating and Maintenance Costs

These costs include not only salaries and wages of administrative and operating personnel, but all materials and expendable supplies. In addition, repairs and replacement costs to keep the plant operating at peak efficiency during its entire life are included in this category.

Historically, the MDC has collected these costs from the cities and towns on the basis of their population.

Water Use as a Basis for Charges. As previously discussed for Capital Cost Recovery, a convenient method of apportioning operating and maintenance costs to the various communities is on the basis of metered water use. The charge can be in proportion to the amount of water used. This method is equitable and conducive to conservation, providing water charges do not provide for lower rates for large users. Again, as directed by the 1975 Legislation, an interim feasible method of handling the largest number of users, namely domestic sources, would be to apportion such costs to communities on the basis of the population served on the assumption that per capita water use is generally uniform. Other sources, however, should be charged on water use along with an applicable surcharge described as follows.

Extra Charges for Strong Industrial Wastes. The basis for these charges can be similar to that for Capital Cost Recovery.

Discharge Regulation. One of the factors which may affect the system size and operating efficiency of primarily the proposed satellite plants is the peak load factor.

The daytime peaks and low night flows of domestic sewage are not easily changed. Industrial waste discharges, however, can often be controlled by planned operating sequences, or by storage of peak flows, or peak concentrations followed by more uniform discharge rates, or holding for discharge at night when other flows to the system are minimal.

If an advantage to the system can be realized from such discharge regulation as may occur at satellite plants, credits should be given to large industrial customers who provide such regulation to the extent such regulation benefits MDC.

As an example of a possible approach to this sort of rate adjustment, three (3) flow classes could be established:

1. Uniform discharge during the day (assuming normal strength) from, for example, 6 a.m. to 6 p.m. or any fraction thereof. Use same charge rate as for domestic sewage.
2. Heavy discharges (say, 50 percent or more of daily average) between 4 p.m. and 8 p.m.  
Increase normal domestic rate by say 25 percent.
3. Night discharge (say, 80 percent of total) between 10 p.m. and 6 a.m.  
Decrease normal domestic rate by say 50 percent.

These percentages are used to illustrate the concept only. An extensive study would be required to establish suitable percentages once detailed facility costs are known. They would need to be adjusted after experience in use and from time to time due to changes.

Where it is beneficial to MDC, it would be the objective to make the Class No. 3 rate low enough to encourage industries to construct acceptable holding tanks from which they could discharge at a uniform rate during the night. This could save money for the industries and at the same time extend the life of the sewerage system, and treatment facilities, by reducing peak loads and making use of available capacity at night. Proposals for storage would require individual study to insure against septic conditions which could add odor problems and/or require chlorination at added cost.

### Rate Coverage and Source

The preceding discussion may be summarized in the following table:

<u>Possible source of funds</u>	<u>Applicable coverage</u>
Property tax	Excess sewer and plant capacity if found significant (capital costs)
Water use bills	Capital costs* Operating costs
Major industries	
Water use	
Suspended solids (extra)	Capital costs*
BOD (extra)	Operating costs
Peak discharge (penalty)	
Night discharge (credit)	

In addition, individual towns for whose benefit sewer extensions or relief sewers are provided will have an increased property tax increment and an increased water use rate charge for sewerage for their share in the capacity of such sewers constructed in the future, exclusive of the nonrecovered portion of Federal grants, if any, and/or State grants, if any.

\*These costs must include Capital Cost Recovery from industries, but need not cover the balance of U. S. government or state grants such as those under the Public Law 92-500 for the portion of the works serving domestic needs and capacity for the future.



## CHAPTER 4

### FINANCIAL PROCEDURES

#### Present Plans

The present 1975 Legislation recommends that MDC annually determine the proportion in which the respective cities and towns shall pay to meet:

interest and principal costs,

industrial cost recovery requirements, and

operation and maintenance costs including the non-domestic share of such.

The amount of money required each year from every city and town on the basis of the above proportions would be estimated by the State Treasurer and processed directly by the State.

In addition to the establishment of proportions, the legislation allows MDC to assist communities to carry out requirements for distributing annual debt service requirements, user charges and industrial cost recovery.

#### Recommended Changes

Consideration should be given to changing the State's role in the financial procedure in accordance with the following concepts.

Since it is found beneficial (see Technical Data Vol. 12) for MDC to retain the method of generating capital funding requirements through the sale of general obligation bonds by the State Treasurer who is empowered to pledge the full faith and credit of the member communities along with having authority to assess each community for amounts required for repayment in accordance with MDC selected apportionments, this procedure is recommended to be retained.

However, it is recommended that industrial cost recovery along with operation and maintenance costs be handled directly by the MDC with the State Treasurer maintaining a special fund for MDC. This fund would be for retention of surplus funds, for processing of industrial cost recovery, or it would be a source for temporary funds needed for year to year balancing of operation and maintenance cost distributions established by MDC.

The considerations affecting the latter recommendations are:

1. MDC will require extensive financial systems in any event to establish, monitor and process apportionments and to fulfill Federal reporting requirements during project implementation stages.
2. It is expected that MDC will have to handle industrial cost recovery in any event due to its specialized nature. Allocation of the retainable amounts from industrial cost recovery will rest with MDC.
3. In line with recommendations made earlier in this report, MDC should be prepared to aid municipalities in distributing industrial surcharges directly to industries involved. This would be preferable, because MDC already would be dealing directly with industries for monitoring, for regulation compliance, for establishment of the basis for allocations and to aid industries in maximizing use of MDC systems at minimum cost.
4. MDC will have to be prepared in any event to aid communities in cost distribution for operation and maintenance due to the expected changes in such during the next several years.
5. This recommended procedure would provide MDC with better control over communities, a vehicle for effective communications, and a regional agency image.
6. Also, greater freedom would exist for MDC to offer extraterritorial services of benefit to water pollution control in the Boston Harbor tributary area and to respond to special problems in environmental control.

## CHAPTER 5

### RECOMMENDATIONS

Major recommendations of this report summarized hereinafter are:

1. That a wastewater service charge system be implemented that is conducive to conservation of resources and to the efficient use by industry of the facilities provided.
2. That for systems proposed in the EMMA study, flow, BOD and SS be used as the basis for determining industrial charges. Since the satellite plants are recommended to be designed for removal of additional pollutants, such as phosphorus, and reduction of oxygen demand through conversion of ammonia, it is recommended that costs associated with these be distributed with the costs attributed to flow.
3. That the basis of apportionment and distribution of costs be on that part of water use that is returned to the sewer system.
4. That population may be used as a basis for apportionment of costs to communities for handling of domestic wastes during the interim period.
5. That costs associated with excess capacity, if found to be significant, be apportioned on the basis of assessed evaluation of properties.
6. That extensions to serve new communities be paid for directly by them in proportion to capacity provided.
7. That industries discharging wastes in strengths in excess of normal domestic wastes be charged through a surcharge system and that MDC be prepared to carry out the actual implementation of such a surcharge system on behalf of the municipalities.
8. That MDC take maximum advantage of State and Federal funding and financing opportunities.



9. That MDC take a major role in dealing with communities and industrial users through enforcement of regulations, through assistance in distributing costs and by providing technical advice.

APPENDIX A

PROPOSED 1975 UPDATE OF  
RULES AND REGULATIONS  
COVERING DISCHARGE OF  
SEWAGE, DRAINAGE, SUBSTANCES OR WASTES  
TO SEWERAGE WORKS  
UNDER CONTROL OF THE METROPOLITAN DISTRICT  
COMMISSION

## APPENDIX A

### PROPOSED 1975 UPDATE OF RULES AND REGULATIONS COVERING DISCHARGE OF SEWAGE, DRAINAGE, SUBSTANCES OR WASTES TO SEWERAGE WORKS UNDER CONTROL OF THE METROPOLITAN DISTRICT COMMISSION

Under the authority of Chapter 92 of the General Laws and under the authority and in compliance with the directive contained in Section 12 of Chapter 705 of the Acts of 1945, the Metropolitan District Commission has established the following rules and regulations covering the discharge of sewage, drainage, substances or wastes into any sewer under its control, or any sewer tributary thereto.

#### ARTICLE I

#### DEFINITIONS

Unless the context specifically indicates otherwise, the meaning of the terms used in these rules and regulations shall be as follows:

1. "Act" shall mean the Federal Water Pollution Control Act as amended, Public Law 92-500 as the same shall be amended from time to time.
2. "BOD" (denoting Biochemical Oxygen Demand) shall mean the quantity of oxygen utilized in the biochemical oxidation of organic matter under standard laboratory procedure in five (5) days at 20 degrees C, expressed in milligrams per liter.
3. "Building Sewer" shall mean the extension from the building drain to the public sewer or other place of disposal, also called house connection.
4. "COD" (denoting chemical oxygen demand) shall mean the quantity of oxygen utilized in the chemical oxidation of organic matter with a strong chemical oxidant under standard laboratory procedure and expressed in milligrams per liter.



5. "Combined Sewer" shall mean a sewer intended to receive both wastewater and storm or surface water.
6. "Commission" shall mean the Metropolitan District Commission of Massachusetts, or any other commission, board or officers duly authorized to act for the Commonwealth in the application of these rules and regulations.
7. "Compatible Pollutant" shall mean biochemical oxygen demand, suspended solids, and fecal coliform bacteria, as herein defined, or as accepted in standard practice for the treatment process considered.
8. "Excessive" shall mean in such magnitude that in the judgment of the Commission, it will cause damage to any facility, may be harmful to the sewage treatment process, cannot be removed in the sewage treatment plant to the degree required to meet the Act and its guidelines, can otherwise endanger life, limb, or public property, and/or which can constitute a public nuisance.
9. "Garbage" shall mean the animal and vegetable waste resulting from the handling, preparation, cooking, and serving of foods.
10. "Garage" shall mean any building wherein is kept or stored one or more motor vehicles, including among others a public or private garage, carport, motor vehicle repair shop or paint shop, service station, lubritorium, car wash, or any building used for similar purposes.
11. "Incompatible Pollutant" shall mean any pollutant which is not defined as compatible pollutant in 7. above.
12. "Industrial User" shall mean any user identified in the Standard Industrial Classification Manual of the U. S. Office of Management and Budget, as amended and supplemented under the following divisions:
  - (a) Division A - Agriculture, Forestry, and Fishing
  - (b) Division B - Mining
  - (c) Division D - Manufacturing

- (d) Division E - Transportation, Communication, Electric, Gas, and Sanitary Service
- (e) Division I - Services

- 13. "Industrial Wastes" shall mean any solid, liquid or gaseous wastes resulting from any industrial or manufacturing process or from the development, recovery or processing of natural resources.
- 14. "Municipality" shall mean any city or town that discharges sewage into the Metropolitan sewerage works whether the city or town is a member of the Metropolitan Sewerage District by legislative action or is served by contract with the Metropolitan District Commission.
- 15. "Metropolitan Sewerage Works" shall mean sewerage works under the control of the Commission.
- 16. "Person" shall mean any individual, firm, company, association, society, corporation, or group.
- 17. "pH" shall mean the logarithm of the reciprocal of the hydrogen ion concentration. The concentration is the weight of hydrogen ions, in grams, per liter of solution. Neutral water, for example, has a pH value of 7 and 2 hydrogen-ion concentration of  $10^{-7}$ .
- 18. "Properly Shredded Garbage" shall mean the wastes from the preparation, cooking, and dispensing of food that have been shredded to such a degree that all particles will be carried freely under the flow conditions normally prevailing in public sewers, with no particle greater than one-half (1/2) inch (1.27 centimeters) in any dimension.
- 19. "Public Sewer" shall mean a common sewer controlled by a governmental agency or public utility.
- 20. "Receiving Waters" shall mean any watercourse, river, pond, ditch, lake, aquifer, the ocean, or other body of surface or groundwater receiving discharge of sewage.
- 21. "Sanitary Sewer" shall mean a sewer that carries liquid and water-carried wastes from residences,

commercial buildings, industrial plants, and institutions together with minor qualities of ground, storm, and surface waters that are not admitted intentionally.

22. "Sewage" is the spent water of a community. (The preferred term is "wastewater".)
23. "Sanitary Sewage" shall mean liquid and water carried wastes from residences, commercial buildings, industrial plants and institutions, exclusive of ground, storm and surface water.
24. "Sewage Treatment Plant" shall mean an arrangement of devices and structures for treating wastewater, industrial wastes, and sludge. Sometimes used as a synonymous with "waste treatment plant" or "wastewater treatment plant" or "water pollution control plant."
25. "Sewer" shall mean a pipe or conduit that carries wastewater or drainage water.
26. "Sewerage Works" shall mean any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage and industrial wastes of a liquid nature including intercepting sewers, outfall sewers, sewage collection systems, pumping, power, and other equipment and their appurtenances. (The preferred term is "treatment works" as used in the Act and its guidelines.)
27. "Shall" is mandatory; "May" is permissive.
28. "Slug" shall mean any discharge of water or wastewater which in concentration of any given constituent or in quantity of flow exceeds for any period of duration longer than fifteen (15) minutes more than five (5) times the average twenty-four (24) hour concentration or flows during normal operation and shall adversely affect the collection system and/or performance of the wastewater treatment works.
29. "Storm Drain" (sometimes termed "storm sewer") shall mean a drain or sewer for conveying water, groundwater, subsurface water, or unpolluted water from any source.



30. "Suspended Solids" shall mean total suspended matter that either floats on the surface of, or is in suspension in, water, wastewater, or other liquids, and that is removable by standard laboratory filtering procedure.
31. "Toxic Wastes" shall be those wastes so specified by the Commission in its Rules and Regulations and as specified in the Act and its guidelines.
32. "Treatment Works" shall mean any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage and industrial wastes of a liquid nature including intercepting sewers, outfall sewers, sewage collection systems, pumping, power, and other equipment and their appurtenances.
33. "User" shall mean any municipality or person receiving services resulting from discharge of its wastewater directly or indirectly to the Metropolitan sewerage system.
34. "Wastewater" shall mean the spent water of a community. From the standpoint of source, it may be a combination of the liquid and water carried wastes from residences, commercial buildings, industrial plants, and institutions, together with any groundwater, surface water, and stormwater that may be present.

## ARTICLE II

### USE OF METROPOLITAN SEWERAGE WORKS

1. All municipalities which connect their public sewers with the Metropolitan sewerage works shall do so subject to the direction, control and regulation of the Commission and any person may, subject to regulations of the Commission and to such terms, conditions and regulations as each municipality may prescribe, connect building sewers with such sewers. All new systems of sewers and extensions of existing systems shall be constructed so as to separate stormwater from ordinary sewage and shall be subject to approval by the Commission.
2. The plumbing of any estate or premises shall be so arranged as to keep such waters as described in 4(a) separate from the sewage and connections shall be made which will conduct the waters to a drain or watercourse and the sewage to the public sewer; but where only one conduit shall have been provided by the municipality, such connections shall be constructed into the street and connected to the conduit so provided, and the municipality shall provide the other conduit and all necessary connections with either conduit.
3. All municipalities which connect their sewers with the Metropolitan sewers shall have in effect a sewer-use ordinance no less stringent than regulations of the Commission itself pertaining to sewer use, together with procedures for monitoring and enforcing compliance with such ordinance. Upon request, the Commission may assist a municipality in developing the ordinance required. Sewer use ordinances and regulations shall be subject to approval by the Commission.
4. No municipality or person shall discharge or cause to be discharged or allow to be discharged into the Metropolitan sewerage works or any sewer tributary thereto any of the following described waters or wastes:
  - (a) Any stormwater, surface water, roof runoff, tide-water, river water, groundwater, subsurface drainage, uncontaminated cooling water, or unpolluted industrial process waters, except

where directly connected to combined sewers with the approval of the Commission.

- (b) Any gasoline, benzene, naphtha, fuel oil, crude petroleum, or any other of its products, or any other flammable or explosive liquid, solid or gas.
  - (c) Any waters or wastes containing toxic or poisonous solids, liquids or gases in sufficient quantity, either singly or by interaction with other wastes, to injure or interfere with any sewage treatment process, constitute a hazard to humans or animals, create a public nuisance, or create any hazard in the receiving waters of the sewage treatment plants.
  - (d) Any waters or wastes have a pH higher than 9.5 or lower than 5.5, or having any other corrosive property capable of causing damage or hazard to structures, equipment, and personnel of the sewerage works.
  - (e) Any solids or viscous substances in quantities or of such size as to be capable of causing obstruction to the flow in sewers, or other interference with the proper operation of the sewerage works; such as, but not limited to ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, unground garbage, whole blood, paunch manure, hair and fleshings, entrails, paper dishes, cups, milk containers, etc., either whole or ground.
5. No municipality or person shall discharge or cause to be discharged or allow to be discharged into any Metropolitan sewerage works or any sewer tributary thereto any of the following described substances, materials, waters, or wastes if it appears likely in the opinion of the Commission that such wastes can harm either the sewers, sewage treatment process, or equipment, have an adverse effect on the receiving waters, or can otherwise endanger life, limb, public property, or constitute a nuisance. In forming its opinion as to the acceptability of these wastes, the Commission will give consideration to such factors as the quantities of subject wastes in relation to flows and velocities in the sewers, materials of construction of the sewers, nature of the sewage treatment



process, capacity of the sewage treatment plant, degree of treatability of wastes in the sewage treatment plant, and other pertinent factors including the requirements of State and Federal agencies of jurisdiction for such discharge to the receiving waters.

Users proposing to discharge toxic or objectionable wastes, including industrial users shall apply for a Permit with the municipality wherein the discharge is located. In the application shall be included along with any other information required by the Commission a description of the proposed treatment system, including flows of all waste drains and concentrations of toxic metals or nonmetals before and after treatment. The permit shall be granted by the municipality wherein the discharge is located with the approval of the Commission. Incompatible pollutants which are not strictly prohibited, shall have their polluttional load levels reduced to the lowest level attainable through the application of the best practicable control technology currently available as defined in Section 304(b) of the Act, unless otherwise indicated in the discharge Permit. If it is found by the Commission that certain pollutants in this category can be reliably removed by the Metropolitan sewerage works, the acceptable pollution load will be increased above the lowest level tributary to that plant attainable by the amount that can be reliably removed, and so indicated in the discharge Permit issued. The attainment of specific concentrations for discharge to the Metropolitan sewerage works by dilution in the absence of control or treatment (i.e., by the use of extraneous or nonprocess water) is strictly prohibited, as are also the following substances:

- (a) Any liquid or vapor having a temperature higher than one hundred fifty (150) degrees F (65 degrees C).
- (b) Any water or waste containing fats, wax, grease, or oils, whether emulsified or not, in excess of one hundred (100) mg/L or containing substances which may solidify or become viscous at temperatures between thirty-two (32) degrees and one hundred fifty (150) degrees F (0 degrees and 65 degrees C).
- (c) Any garbage that has not been properly shredded.

- (d) Any waters or wastes containing excessive strong acid iron pickling wastes, or concentrated plating solutions whether neutralized or not.
- (e) Any waters or wastes containing toxic or objectionable metals including, but not limited to the following:

Antimony	Chromium	Mercury
Arsenic	Copper	Nickel
Barium	Iron	Selenium
Beryllium	Lead	Silver
Boron	Manganese	Tin
Cadmium		Zinc

Such wastes must be treated for removal of these metals to values at least equivalent to the minimum solubility of their metallic hydroxides. Industries discharging or requesting to discharge beryllium, mercury, arsenic or selenium in any quantities are referred to the State Division of Water Pollution Control.

- (f) Any waters or wastes containing excessive toxic or objectionable nonmetals, including but not limited to:

chlorides	phenols
cyanides	sulphides

Limits for nonmetals shall be reviewed and approved separately.

- (g) Any sludges, filter cakes, etc. produced by treatment or by natural occurring deposition in operating baths or tanks.
- (h) Any waters or wastes containing taste-producing or odor-producing substances, in concentrations which exceed limits which may be established by the Commission.
- (i) Any radioactive wastes or isotopes of such half-life or concentration as may exceed limits

established by the Commission in compliance with State or Federal regulations.

(j) Any material which exerts or causes:

- (1) Unusual concentrations of inert suspended solids (such as, but not limited to, Fuller's earth, lime slurries, and lime residues) or of dissolved solids (such as, but not limited to, sodium chloride and sodium sulfate).
- (2) Excessive discoloration (such as, but not limited to, dye wastes and vegetable tanning solutions).
- (3) Unusual volume of flow or concentration of wastes constituting "slugs" as defined herein.

(k) Any waters or wastes containing substances which are not amenable to treatment or reduction by the sewage treatment processes employed, or are amenable to treatment only to such degree that the sewage treatment plant effluent cannot meet the requirements of other public agencies having jurisdiction over discharge into the receiving waters.

(l) All analysis shall be made in accordance with the latest revision of "Standard Methods for Examination of Water and Wastewater" as published by the American Public Health Association, the American Water Works Association and the Water Pollution Control Federation, where such have been standardized.

6. Users shall make wastewater acceptable under the standards established herein before discharging to the sewerage system. Any facilities required to pretreat wastewater to a level acceptable to the Commission shall be provided and maintained at the user's expense. A description and detailed plans showing the facilities and operating procedures shall be submitted for review to the municipality wherein the discharge is located, and shall be approved by the Commission before construction of the facility is authorized by the municipality. The approval of such plans and operating procedures will in no way relieve such persons from the responsibility of modifying the facility as necessary to produce an



effluent acceptable to the Commission under the provisions of these regulations, and meeting requirements of Federal or State agencies of jurisdiction. Any subsequent changes in the approved facilities or method of operation shall be reported to and be acceptable to the Commission.

Any person to which pretreatment standards are applicable shall be in compliance with such standards within the time required by Federal or State laws, or as directed by the Commission, whichever is sooner.

7. No municipality shall discharge or cause to be discharged or allow to be discharged into any Metropolitan sewerage works or any sewer tributary thereto any septic tanks or cesspool cleanings or any sewage or industrial wastes which originate in any territory outside the limits of the Metropolitan Sewerage District, unless such discharges are in conformance with a Permit granted by the Commission.
8. Garages and other establishments where gasoline is used or where wastes containing grease in excessive amounts or any flammable wastes, sand, or other harmful ingredients can be discharged and are connected with public sewers, shall be provided with a suitable trap or separator. All traps or separators shall be of a type and capacity approved by the Commission and shall be located so as to be readily and easily accessible for cleaning and inspection.
9. Where preliminary treatment or flow-equalizing facilities, or traps or separators are provided for any waters or wastes, they shall be maintained continuously in satisfactory and effective operation by the owner at his expense.
10. Industrial users and other persons engaged in any activity producing industrial wastes shall obtain a Permit from the municipality wherein the discharge is located prior to connecting to or discharging to a sewerage system tributary to the Metropolitan sewerage works. Such a Permit can only be granted with approval of the Commission. Industrial users presently discharging to the sewerage system shall within 60 days from the date of promulgation of these regulations complete and file with the municipality an application form. The Commission may also require any other person who is discharging or proposing to discharge

wastes into a sewerage system tributary to the Metropolitan sewerage works to obtain a Permit. The Commission may change the conditions of a Permit from time to time as circumstances, or law or regulations enacted or promulgated by the State or Federal government or its agencies of jurisdiction may require. Any significant change in wastewater strengths or volumes discharged shall be reported to the municipality for determination of the need to change the Permit conditions and related fees. Municipalities granting changes in a Permit shall do so with the approval of the Commission.

- (a) Persons required to obtain a Permit shall complete at their own expense and file with the municipality wherein such discharge is located an application form which is available at the municipality or at the Office of the Commission.
- (b) After tentative approval has been granted by the municipality, subject to approval by the Commission the Commission will evaluate the data furnished. If insufficient data has been furnished, the Commission will notify the municipality and action will not be taken until the desired information is received. After acceptance of data furnished, the Commission will approve the Permit. Dependent on the constituents and volume of the wastes proposed to be or being discharged into the system, the Commission may stipulate special conditions and terms upon which the Permit will be issued. Permits may contain the following:
  - (1) Limits on rate and time of discharge or requirements for flow regulation and equalization.
  - (2) Installation of inspection, flow measurement and sampling facilities including access to such facilities. (See 12(a))
  - (3) Specifications for monitoring programs which may include flow measurement and sampling locations, frequency and method of flow measurement and sampling, number, types and standards for tests and reporting schedule. (See 12(b))
  - (4) Submission of discharge reports.



- (5) Special service charges or fees.
  - (6) Pretreatment requirements.
  - (7) Other conditions as deemed appropriate by the Commission to ensure compliance with these regulations.
- (c) A permit shall not be reassigned or transferred.
- (d) The conditions of all Permits shall be enforced by the municipality and/or Commission in accordance with the provisions of these regulations.
11. Each person issued a Permit shall submit at least two copies of a duly signed annual discharge report to the municipality wherein the discharge is located. One copy of all such reports shall be submitted by each municipality to the Commission on a date selected by the Commission. The Commission may require more frequent reports if in its judgment the wastes being discharged are in violation of these regulations. The report shall include but not be limited to nature of process, volume, rates of flow, mass emissions, production quantities, hours of operation, personnel, or other information that relates to the generation of waste, including substances and concentration in the wastewater discharge. The report may also include the chemical constituents and quantity of liquid or gaseous materials stored on site even though they may not normally be discharged.
- The Commission will evaluate the data furnished. If insufficient data has been furnished, the Commission may request additional information. If it appears that the person is discharging "excessive" amounts or rates of pollutants, the Commission may revoke the person's existing Permit and issue a more stringent one. Contrarily, if a person has shown that in-house modifications have improved the characteristics and/or volume of his discharge, the Commission may lessen special terms or conditions upon which the Permit was issued.
12. When required by the Commission, the owner of any property serviced by a building sewer carrying industrial wastes shall install a suitable control or measuring device together with such necessary manholes, chambers, meters any other appurtenances in the building sewer to facilitate observation,



sampling, and measurement of the wastes, such manhole or chamber, when required, shall be accessibly and safely located and shall be constructed in accordance with plans approved by the Commission. The manhole, chamber, meters, etc., shall be installed by the owner at his own expense, and shall be maintained by him so as to be safe and accessible and in good operating condition at all times. The records from the meters and measuring devices shall be furnished to the Commission upon request therefor.

- (a) The facilities shall be constructed in accordance with all applicable construction standards and specifications. Construction shall be completed within 90 days following receipt of written notification by the municipality and/or Commission.
- (b) The Commission may inspect the facilities of any user to ascertain whether the purpose of these regulations are being met and all wastewater requirements are being complied with. Persons or occupants of premises where wastewater is created or discharged shall allow the Commission or its representative ready access at all reasonable times to all parts of the premises for the purposes of inspection or sampling or in the performance of any of their duties.

The Commission shall be deemed to be performing a governmental function for the benefit of the general public and neither the Commission or its representative shall be liable for any loss or damage, as a result of the performance of such governmental function.

Where a user has security measures in force which would require proper identification and clearance before entry into their business or premise, the business shall make necessary arrangements with their security guards so that upon presentation of suitable identification, personnel from the Commission will be permitted to enter without delay for the purposes of carrying out their specific responsibilities.

- (c) All measurements, tests, and analyses of the characteristics of waters and wastes to which reference is made in these rules and regulations shall be determined in accordance with the latest edition of "Standard Methods for the Examination

of Water and Wastewater," published by the American Public Health Association, the American Water Works Association and the Water Pollution Control Federation, and shall be determined at the control manhole or chamber provided, or by use of suitable samples taken at the control manhole or chamber. In the event that no special manhole or chamber has been provided, the control point shall be considered to be the nearest downstream manhole in the public sewer to the point at which the building sewer is connected. Sampling shall be carried out by customarily accepted methods to reflect the effect of constituents upon the sewerage works and to determine the existence of hazards to health and property. The particular analyses involved will determine whether a twenty-four (24) hour composite of all effluents of the premises is appropriate or whether a grab sample or samples should be taken. BOD and suspended solids analyses shall normally be obtained from 24 hour composites of all effluents whereas pH's shall normally be determined from periodic grab samples.

- (d) All information and data on a user obtained from reports, questionnaires, permit application, permits and monitoring programs and from inspections shall be available to the public without restriction unless the user specifically requests and is able to demonstrate to the satisfaction of the Commission that the release of such information to the general public would divulge information or processes or methods that would give a business advantage to competitors who did not know this information. However, all such information shall be made available to governmental agencies for use in making studies or for the use of the Commission or the State or any State agency in judicial review or enforcement proceedings involving the person furnishing the information.

- 13. Each user shall provide protection from accidental discharge in violation of these regulations. .

For countermeasures to be taken by the Commission to minimize damage to the sewerage system and receiving waters, users shall notify the municipality wherein such discharge is located and the Commission immediately upon accidentally discharging wastes in violation of these regulations.

This notification shall be followed, within 15 days of the date of occurrence, by at least two copies of a detailed written statement to the municipality describing the causes of the accidental discharge and the measures being taken to prevent future occurrence. The municipality will in turn transmit one copy of such statement to the Commission along with a report of its intended actions.

Such notification will not relieve users of liability for any expense, loss or damage to the system, or for any fines imposed on the Metropolitan Sewerage District on account thereof.

In order that employees of users be more fully informed, copies of these regulations shall be made available to all employees of the user. A notice shall be furnished and permanently posted on the user's bulletin board advising employees whom to call in case of an accidental discharge in violation of these regulations.

14. When the Commission finds that a discharge of wastes has been taking place, or threatens to take place, in violation of prohibitions or limitations of these regulations, or the provisions of the Discharge Permit:

(a) The Commission may issue an order to cease and desist, and direct that those persons not complying with such prohibitions, limits, requirements, or provisions:

- (1) Comply forthwith;
- (2) Comply in accordance with a time schedule set forth by the Commission; or
- (3) Take appropriate or remedial preventative action in the event of a threatened violation.

(b) The Commission may require the user to submit for approval, with such modifications as it deems necessary, a detailed time schedule of specific actions that the user shall take in order to prevent or correct a violation of requirements.



15. When a discharge by a user causes an obstruction, damage, operational problems or any other impairment to the Metropolitan sewerage works, the Commission may assess a charge against the user for the work required to correct the problems and add such cost to the apportioned amount of the municipality where such discharge is located. In the case of a person, the Commission may specifically identify the amount and the person.
16. When a user fails to provide the information needed and requested by the Commission for proper operation, maintenance and cost analysis of the Metropolitan sewerage works, the Commission may assess a charge against the user for the work required to secure such information and add such cost to the apportioned amount of the municipality where such discharge is located. In the case of a person, the Commission may specifically identify the amount and the person.
17. Any user who discharges wastes in violation of the provisions of Federal and State laws and causes the Commission to be penalized or fined for such violation, shall be charged the cost of the fine or fines imposed against the Commission and such cost shall be added to the user's apportioned wastewater service charge. In case of a person, the Commission may specifically identify the amount and the person.
18. Any user who violates the provisions of this regulation or any user who knowingly makes any false statements, representations, records, reports, plans or other documents filed with any municipality or the Commission, or who falsifies, tampers with or knowingly renders inaccurate, any monitoring device or method required under this regulation shall be punished by a fine of not less than one thousand nor more than ten thousand dollars for each day such violation continues, or shall be subject to a civil penalty not to exceed ten thousand dollars per day of such violation which may be assessed in an action brought on behalf of the commonwealth in any court of competent jurisdiction.

In addition, the provisions of Section 309 of the Act relative to violations and false statements may be invoked.

19. Failure on the part of any municipality to comply with any rule or regulation contained herein, or with

any order made under the authority thereof, lawfully affecting such municipality, shall be sufficient cause for the levying and collecting by the Commission from such municipality of such additional assessment or assessments as the Commission may deem necessary to compensate it for the disposal of sewage, drainage, substances or wastes for such municipality; provided that no such additional assessment shall be levied on any such municipality in any one year which shall exceed the lesser of an amount equal to one twentieth of one percent of the taxable value of such municipality, or the sum of two hundred thousand dollars.

20. Any user, permit applicant, or permit holder affected by any decision, action, or determination, including cease and desist orders made by the Commission interpreting or implementing the provisions of these regulations or in any permit issued hereunder may file with the Commission a written request for reconsideration within 10 days of such decision, action, or determination, setting forth in detail the facts supporting the user's request for reconsideration.

The Commission shall make a final ruling on the appeal within 10 days of the close of the meeting. The Commission's decision, action, or determination shall remain in effect during such period of reconsideration.

21. No statement contained in this article shall be construed as preventing any special agreement or arrangement between the Commission and any municipality and/or any industry whereby an industrial waste of excessive strength or character may be accepted by the Commission.

APPENDIX B

Excerpts from the Report to  
the MDC entitled Survey of  
Industrial Wastes Within  
Metropolitan Eastern Massa-  
chusetts dated March 1975 by  
Metcalf & Eddy, Inc.

Exhibit B-1



## APPENDIX B

### EXCERPTS FROM THE REPORT TO THE MDC ENTITLED SURVEY OF INDUSTRIAL WASTES WITHIN METROPOLITAN EASTERN MASSACHUSETTS

There were 375 industrial plants included in the industrial waste survey. Each of the industries was sent a survey questionnaire with the cover letter issued by the Massachusetts Division of Water Pollution Control. These materials are presented in Exhibit B-1. In addition, each of these industrial plants was contacted by telephone or visited in person. The industries were broken into three major categories:

- I. Eliminated            214 or 57 percent
- II. Nonresponsive      43 or 11.5 percent
- III. Visited            118 or 31.5 percent

Plants which fell into the first category were those which did not meet the flow criteria of discharging 50,000 gallons per day, although some firms which would technically fall in this category were visited.

While every firm was contacted and a large majority indicated a willingness to cooperate, there were some firms which refused from the outset to cooperate or who indicated that their cooperation would be unlikely. There were others who professed intent to cooperate but had not returned questionnaires by the cutoff date. Of the 43 plants included in the nonresponsive category, 14 or only 3-1/2 percent were listed as entirely noncooperative. Five were visited but did not return questionnaires.

The third category included all those plants which were visited. Attempts were made in advance to ascertain whether or not each plant to be visited met the flow criteria before expending the time and effort involved in making a plant visit. These visits involved close scrutiny of the questionnaires, follow-up questions of plant personnel and complete tours of the plant with particular attention paid to those areas from which substantial wastes might originate. Notes of each visit were made. Schematic flow diagrams were drawn up where necessary to clarify sources of process wastewater.

A sampling program was conducted aimed at indexing key firms or industries which were major "compatible" dischargers. Such firms would be expected to have substantial BOD and suspended solids loadings which would be, for the most part, readily treated by a municipal or regional treatment plant. However, firms of this type which had recently conducted wastewater analyses of their own were excluded from sampling.

The survey resulted in the production of 181 files. A summary listing of major industrial dischargers, including estimates of the average daily values of flow, BOD<sub>5</sub> and suspended solids based upon laboratory data where available, and upon experience, judgment and direct observation of the plant when not available, is presented in the basic report. With the exception of the sampled plants, all flow values were based upon industry-supplied figures. No estimates were given for nonresponsive firms. The summary lists all those firms which are known to meet the "major discharger" criteria on a flow basis and includes those nonresponsive firms which may or may not meet this criteria if information were available to characterize them.

The types of firms which were sampled include: a tanner of sheep and cowhides, a manufacturer of gelatin, two paper mills, one textile mill, one ice cream producer, a fish processor and a meat processor. Geographically, the plants range from central Boston, to Salem, on the north, Marlborough, to the west and Canton, to the south. The degree of difficulty involved in sampling plants within the study area ranged from relatively simple to extremely difficult. Sampling was most difficult in the greater Boston area where plants are generally located in older buildings with multiple sewer connections. Plant personnel often have incomplete knowledge of their sewer systems. Here cross-connections are common, and access sometimes impossible without physical modifications to the sewer systems or hazardous entry into manholes outside the plants on busy streets. With many of the plants, the high levels of suspended solids presented major problems in obtaining representative samples. Due to the physical construction of the old sewer systems, flow measurement can entail considerable effort and imagination in designing, constructing and installing flow measuring devices. As a result, any full-scale effort conducted by the Metropolitan District Commission or others to sample all the major industrial dischargers would probably be very costly and time consuming.

The sampling effort in the survey was directed primarily towards "compatible" dischargers. The characterization of "noncompatible" wastes would require a more extensive survey, would entail more extensive sampling and would be considerably more expensive to conduct.

The Army Corps of Engineers supplied the following data: property area, front footage and assessed valuation. These values were used in those instances where industries did not supply this information.





OFFICE OF THE DIRECTOR  
DIVISION OF WATER  
POLLUTION CONTROL

*The Commonwealth of Massachusetts*  
*Water Resources Commission*  
*Leverett Saltonstall Building, Government Center*  
*100 Cambridge Street, Boston 02202*

Gentlemen:

The Massachusetts Division of Water Pollution Control under the authority of the Massachusetts Clean Waters Act and the Federal Water Pollution Control Act is working in conjunction with the Metropolitan District Commission to determine the future needs and costs of water pollution control facilities in the Eastern Massachusetts Metropolitan Area.

To accomplish this purpose the firm of Metcalf & Eddy has been retained by the Metropolitan District Commission to survey selected industries within the study area. They are primarily interested in current flows and pollutants and the potential for their reduction in the future.

A questionnaire has been enclosed that they would like to have a member of your staff complete as fully as possible. All data reported will be placed on file with the Metropolitan District Commission and is not for public distribution. Please complete the questionnaire and return it to Mr. Vittands whose address is listed below.

A representative from Metcalf & Eddy may contact you sometime during the next five weeks to visit your plant and possibly take samples.

If you have any questions regarding the survey please feel free to call either of the following individuals:

Martin Weiss, Director  
Environmental Planning  
Metropolitan District Commission  
20 Somerset Street  
Boston, Massachusetts 02108  
Telephone Number: 727-8880

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Jekabs P. Vittands, Project Manager  
Metcalf & Eddy Engineers  
1200 Statler Building  
Boston, Massachusetts 02116  
Telephone Number: 423-5600 (Ext. 226)

Thank you very much for your cooperation in this matter.

Very truly yours,

  
Thomas C. McMahon  
Director

TCM/adb

INDUSTRIAL WASTE SURVEY AND INVENTORY QUESTIONNAIRE  
EASTERN MASSACHUSETTS METROPOLITAN AREA

Date Form Completed \_\_\_\_\_

1. Industry Name: \_\_\_\_\_

2. Address: \_\_\_\_\_

\_\_\_\_\_ Tel. No. \_\_\_\_\_

2. Indicate applicable S.I.C. codes to describe manufacturing process: \_\_\_\_\_  
\_\_\_\_\_

3. Indicate principal products and average production levels (use attached sheet if necessary):

4. Indicate principal raw materials and intermediate chemicals involved in the process with average consumption levels (use attached sheet if necessary):

Note

For assistance in answering questions relating to this form, please contact Mr. Clifford Bowers at Metcalf & Eddy, Inc., Tel. No. 423-5600, Ext. 339. This material is to be used for planning purposes only.



5. How many people are currently employed at your plant? \_\_\_\_\_  
How many shifts are in operation? \_\_\_\_\_ Hours of operation?  
\_\_\_\_\_ Are your operations primarily batch? \_\_\_\_\_ or  
continuous? \_\_\_\_\_
6. Do you maintain records of water consumption? \_\_\_\_\_  
Wastewater flow? \_\_\_\_\_ Do you have records or reports of  
wastewater analyses conducted for you, the EPA, or by outside  
laboratories? \_\_\_\_\_ If you have any such information  
collected during the past 12 months, please attach summary  
copies with this questionnaire.
7. Do you discharge process wastewater to the municipal sewer  
system? \_\_\_\_\_ Do you discharge sanitary wastewater to the  
municipal sewer? \_\_\_\_\_ If you have any wastewater  
discharges to other than the municipal system, please describe  
these:
8. Concerning water consumption, please indicate your quarterly  
usage (indicate units - either cubic feet or gallons):

		Private water company	Owner source		
	<u>Municipal</u>		<u>Surface</u>	<u>Groundwater</u>	<u>Total</u>
<u>1973</u>					
3rd Quarter					
4th Quarter					
<u>1974</u>					
1st Quarter					
2nd Quarter					
Total	_____	_____	_____	_____	_____

9. Please estimate the following (gallons per day (gpd)):

	<u>July 1, 1973 to July 1, 1974</u>		
	<u>Discharged to sewer, gpd</u>	<u>Discharged to stream, gpd</u>	<u>Losses from system (evap- oration, percolation, etc.)*</u>
A. Uncontaminated water (cooling, boiler, etc.)	_____	_____	_____
B. Process wastewater	_____	_____	_____
C. Sanitary wastewater (bathrooms, locker rooms, etc.)	_____	_____	_____
D. Water incorporated in product	_____	_____	_____
Total	_____	_____	_____

\*Indicate disposal to septic tanks or leaching fields, if applicable.

Remarks:

10. Please estimate the following parameters describing your combined wastewater (process plus sanitary) streams (if you indicated no available lab data under question 6, give your best estimate or merely indicate present, if known to be present):

	<u>Minimum daily value</u>	<u>Average daily value</u>	<u>Maximum daily value</u>
Flow, gpd			
Temperature, deg. F.			
BOD <sub>5</sub> , mg/L			
COD, mg/L			
Suspended solids, mg/L			
Chlorine demand, mg/L			
pH			
Alkalinity/acidity, mg/L			
Total phosphorous, mg/L			
Orthophosphate, mg/L			
Kjeldahl nitrogen, mg/L			
Ammonia nitrogen, mg/L			

Indicate levels of other waste parameters if known:

Chrome (+6)

Chrome (+3)

Cyanide

Chloride

Sulfate

Phenols

Other toxics:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Remarks:



11. Are plans available which show your in-plant drains, sewers and plumbing?\_\_\_\_\_
12. Do you presently provide any wastewater treatment prior to discharge to municipal sewers or to a waterbody?\_\_\_\_\_
- Describe below or on separate sheet.
13. Do you segregate process from nonprocess wastewater streams?  
\_\_\_\_\_employ water conservation and/or reuse procedures?  
\_\_\_\_\_ Please describe any water conservation, reuse or in-plant pollution abatement programs. (Below or on separate sheet).
14. Please attach a schematic diagram of process water and material flows together with a materials balance sheet.
15. Please indicate:  
property area:\_\_\_\_\_  
front footage:\_\_\_\_\_  
assessed valuation:\_\_\_\_\_
16. Is any expansion or contraction of your present operations now contemplated?\_\_\_\_\_Do you expect water or wastewater quantity or quality to change in the near future?\_\_\_\_\_
- If yes, please amplify:

17. Please give the name, title and phone number of a plant representative who can be contacted if any further questions develop:

\_\_\_\_\_

18. Questionnaire filled out by: \_\_\_\_\_

Title: \_\_\_\_\_

APPENDIX C

SECTIONS OF CHAPTERS 92 AND 705  
OF THE MASSACHUSETTS GENERAL LAWS  
RELATIVE TO THE METROPOLITAN  
SEWERAGE DISTRICT



## APPENDIX C

### SECTIONS OF CHAPTERS 92 AND 705 OF THE MASSACHUSETTS GENERAL LAWS RELATIVE TO THE METROPOLITAN SEWERAGE DISTRICT

#### CHAPTER 92

##### Section 1

The metropolitan district commission, in this chapter called the commission, shall construct, maintain and operate such main sewers and other works as shall be required for a system of sewage disposal for Arlington, Belmont, Boston, Braintree, Brookline, Cambridge, Canton, Chelsea, Dedham, Everett, Framingham, the north sewer district of Hingham, Lexington, Malden, Medford, Melrose, Milton, Natick, Needham, Newton, Norwood, Quincy, Randolph, Reading, Revere, Somerville, Stoughton, Stoneham, Wakefield, Walpole, Waltham, Watertown, Wellesley, Westwood, Weymouth, Wilmington, Winchester, Winthrop and Woburn known as the metropolitan sewerage district. The commission may in addition contract with any city or town for the extension thereto of said system of sewage disposal and for the reception and disposal of the sewage therefrom. The commission may also contract with any city or town for the admission of said city or town to said sewerage district\* and may contract with any city or town for the use of a part of the metropolitan system as a municipal sewer. The commission may also contract with any city or town for the acquisition of the local sewer to become a part of the metropolitan system.

##### Section 1A

On or before October first of each year the commission shall submit to the officials of the cities and towns in the metropolitan sewerage district a statement of the finances of the district which shall include: (1) a report of the previous fiscal year showing the expenditures for maintenance and operation of the system, for debt service, and for improvements; (2) a statement of the debt outstanding at the end of the previous fiscal year; (3) the requirements for principal and interest on said debt in the current and following fiscal years; (4) a statement indicating the unexpended balance of funds previously appropriated or authorized to be expended for improvements or extensions of the sewerage system; and (5) a statement indicating the amounts which the commission deems to be required for improvements or extensions during the succeeding fiscal year.

On or before November first of each year the commission shall hold a public hearing on the subject of proposed improvements or extensions of the sewerage system.

\*The following municipalities became members of the Metropolitan Sewer District by contract on the dates shown. Ashland (1964), Bedford (1958 portion, 1970 entire town), Burlington (1965) and Holbrook (1971).

No apportionment of the expense of construction of an extension of the sewerage system or of a relief sewer under the provisions of section five B shall be established by the commission unless notice of the proposed apportionment has first been given to each city or town served by the sewerage system. The commission shall hold a public hearing thereon.

Notice of any public hearing required by this section shall be given not less than fourteen days prior to the date of such hearing to the city or town manager, if any, of each city or town named in section one and of any other city or town affected; otherwise to the mayor or board of selectmen of each such city or town.

## Section 2

Any town, within the limits of which any main sewer under the control of the commission is situated, shall connect its local sewers with such main sewer except as hereinafter provided, subject to the direction, control and regulation of the commission, and any person may, subject thereto and subject to such terms, conditions and regulations as each town may prescribe, connect private drains with such main sewer. All systems of sewers, and extensions of existing systems constructed after January first, nineteen hundred and seventy-six, making connection with the metropolitan sewerage district system shall be constructed in accordance with the so-called separate system of sewerage so as to totally exclude storm water and water from roofs and grounds.

## Section 3

Whoever wantonly or maliciously destroys or injures any sewer or other property, held or used by the commission for the purpose of constructing, operating or maintaining said systems of sewage disposal, shall forfeit and pay to the commonwealth three times the amount of the damages assessed therefor, to be recovered by any proper action, and on conviction thereof shall be punished by fine not exceeding one thousand dollars and by imprisonment not exceeding one year.

## Section 4

Any money collected or received by the state treasurer from checks deposited with the commission by bidders for work on the systems of sewage disposal and by it declared forfeited, and for breach of any condition of any contract made with it in relation to the construction, maintenance or operation of the systems of sewage disposal, shall be applied to the payment of interest upon the loan issued for the construction, maintenance or operation of said systems known as the Metropolitan Sewerage Loan.

## Section 5

The proportions in which each of the cities and towns included in the metropolitan sewerage district shall annually pay to meet the total interest and principal requirements for each fiscal year on debt incurred for the metropolitan sewerage district system, shall be based on the respective populations of said cities and towns as ascertained by the last preceding state census, and on the population equivalents of the industrial wastes, as defined in section five A, contributed to that system by the respective cities and towns, as determined by the commission. If less than the whole area of any city or town is included in the metropolitan sewerage district, the population and population equivalents only of that part of the city or town so included, as determined by the commission, shall be used as a basis for determining the proportions to be paid under this section.

## Section 5A

As used in section five and in this section, "industrial wastes" shall mean wastes discharged to the metropolitan sewerage district system by users who would be subject to the cost-recovery provisions of federal law with respect to any federal grant that might be made for construction of works that will treat such wastes. "Non-industrial wastes" include all other wastes.

The commission shall annually calculate the portions of all federal construction grants awarded after March first, nineteen hundred and seventy-three, that are attributable to treatment of industrial wastes received into the metropolitan sewerage district system from cities and towns served by that system. The commission shall further allocate such portions among the cities and towns so served, in accordance with the population equivalents of their industrial waste flows to the treatment works for which the federal construction grants were awarded. If federal law permits, the commission may aggregate the industrial waste portions of such grants and allocate such aggregated sum among the cities and towns in proportion to the population equivalents of their industrial



waste flows to the metropolitan sewerage district system. The commission shall inform each city and town of its allocated share as determined under this section.

Each member city and town to which a share of cost is thus allocated shall assess its industrial users to recover from them the portions of that share which are attributable to treatment of their wastes. Every municipal program of industrial cost recovery and any amendments thereto shall be subject to the approval of the commission, which shall not be withheld if the program meets requirements of federal law, and, upon request, the commission may assist a city or town in the development and application of appropriate methods of assessment. Such methods may include division of industrial users into classes according to their typical wasteload characteristics.

If, within the time allowed for meeting federal grant conditions, any city or town served by the metropolitan sewerage district system fails to establish an acceptable program of industrial cost recovery in accordance with this section, the commission shall establish, and may from time to time alter and amend, an industrial cost recovery program which such city or town shall promptly adopt and implement, pending establishment of its own acceptable program in accordance with the preceding paragraph.

The proceeds of industrial cost recoveries under this section shall be remitted not less than annually, in the form of checks made payable to the commonwealth, to the state treasurer, who shall deposit them in a special fund to be known as the Metropolitan District Commission Wastewater Management Fund. Such fund shall be invested and payments shall be made from it from time to time as may be required by state or federal law, provided that not less than ten per cent of all cost recoveries deposited in the fund, together with interest earned thereon, shall, subject to appropriation, be used to defray administrative expenses of the commission.

## Section 5B

The cost of construction of extensions of the metropolitan sewerage district system to provide service for additional cities and towns, or to provide additional service for one or more cities and towns, shall be paid by the cities and towns so benefited to the extent that such cost is not met by federal or state construction grants. The annual amounts required to meet payments of principal and interest on debt incurred to finance such construction, as estimated by the state treasurer, and to meet any deficiencies in the amount previously paid in, shall be apportioned among such benefited cities and towns in proportion to the respective additional capacities thereby made available to them by such construction. The proportion to be paid by each city and town benefited may be established by law; provided, however, that if such proportions are not so established they shall be determined by the commission.

## Section 6

The proportions in which the cities and towns included in the metropolitan sewerage district system shall annually pay to meet the total cost of operation and maintenance, including replacement, of the system shall be based on their respective populations contributing to the system, and on the population equivalents of other wastes contributed to the system by the respective cities and towns, as determined by the commission. If less than the whole area of any city or town is included in the metropolitan sewerage district, the contributing population and population equivalents only of that part of the city or town served by the district, as determined by the commission, shall be used as a basis for determining the proportions to be paid under this section. The commission shall annually allocate the cost shares for operation and maintenance, including replacement, among the cities and towns so served. For purposes of this section, "replacement" shall mean such expenditures for obtaining and installing equipment, accessories, or appurtenances during the useful life of treatment works as are necessary to maintain

the capacity and performance for which the works are designed and constructed.

Each city and town to which a portion of cost is thus allocated shall adopt and administer a program of user charges requiring all users within its jurisdiction to pay their proportionate shares of such allocation. Every such program and any amendments thereto shall be subject to approval of the commission, which shall not be withheld if the program meets requirements of federal law, and, upon request, the commission may assist a city or town in the development and application of appropriate methods of assessment. Such methods may include division of users into classes according to their typical wasteload characteristics.

If, within the time allowed for meeting federal grant conditions, any city or town served by the metropolitan sewerage district system fails to establish an acceptable program of user charges in accordance with this section, the commission shall establish, and may from time to time alter and amend, a user charge program which such city or town shall adopt and implement, pending establishment of its own acceptable program in accordance with the preceding paragraph.

#### Section 6A

The commission may require present and prospective municipal, industrial or other users of the metropolitan system, or of any sewer tributary thereto, to comply with applicable provisions of federal or state law respecting (1) toxic and pretreatment standards; (2) construction, operation and maintenance of pretreatment facilities; (3) monitoring, record-keeping and reporting of discharges to the system; (4) notification of proposed new discharges or substantial changes in discharges to the system; (5) user charges; and (6) industrial cost recoveries.

#### Section 6B

Officers or agents of the commission may enter at reasonable times any property, public or private, connected directly or indirectly to the metropolitan sewerage district system, for purposes of



inspecting or sampling any sewage, drainage, substances or wastes conveyed through such a connection; of inspecting any monitoring equipment or procedures required to be maintained with respect to such discharges; and of examining any records pertaining to such discharges or to the operation of pretreatment works.

No information acquired by officers or agents of the commission upon entry under this section may be used in any criminal proceeding based on such information against an individual who makes it available upon demand to such an officer or agent, except in a prosecution for the making of a false statement or record or for otherwise failing to comply with recording requirements under federal or state law.

#### Section 7

On or before September first of each year, the commission, in accordance with sections five, five A, five B, and six, and after consultation with the cities and towns served by the metropolitan sewerage district, shall establish the proportions in which the respective cities and towns shall annually pay money to the commonwealth to meet interest and principal costs, industrial cost-recovery requirements, and costs of maintenance and operation of the metropolitan system. For these purposes, calculations of industrial waste contributions from each city and town shall be based on current and annually updated industrial waste surveys. Not later than September first of each year the commission shall submit to the officials of such cities and towns the ratios of apportionment so established. Not later than October first of each year the commission shall certify and transmit its determinations to the state treasurer.

#### Section 8

The amount of money required each year from every such city and town to meet the interest and principal requirements and costs aforesaid and the deficiency, if any, shall be estimated by the state treasurer in accordance with the

proportions as determined aforesaid by the commission, and shall be included and made a part of the sume charged to such city or town, and shall be paid by the city or town to the commonwealth as provided by section twenty of chapter fifty-nine.

#### Section 8A

The commission may adopt, modify and repeal regulations for implementing and administering the provisions of sections one A, two, and five to eight, inclusive, and may issue orders to municipal, industrial or other users directing compliance with the terms of any such regulation or provision.

Whoever violates any provision of section two, six A, or six B, or any regulation, ordinance or order adopted or issued thereunder or under section twelve of chapter seven hundred and five of the acts of nineteen hundred and forty-five, shall be punished by a fine of not less than one thousand nor more than ten thousand dollars for each day such violation continues, or shall be subject to a civil penalty not to exceed ten thousand dollars per day of such violation which may be assessed in an action brought on behalf of the commonwealth in any court of competent jurisdiction.

#### Section 9

In this section surface or storm water and such other waters as shall be specified by the department of public health shall be designated as waters and all other waters and sewage shall be designated as sewage. The owner of every estate whose sewage is to be taken into any metropolitan sewer shall, in plumbing his estate, so arrange the plumbing as to keep the waters separate from the sewage, and shall, as directed by the officer having charge of the maintenance of sewers in the town, make connections for, and conduct, the waters into the drain and the sewage into the sewer; but where only one conduit shall have been provided in the street by the town, such owner shall, as directed by said officer, construct said connections into the street and connect them with the conduit so provided, and the town shall provide the other conduit and all necessary connections with either conduit.

Any town, except Boston, using any metropolitan sewer may, in any year, and shall, in any year specified by the officer or board having charge of sewers, expend one twentieth of one per cent of its taxable valuation,

to be met by loan outside the debt limit, in the construction, in the connection with said sewers, of branch intercepting sewers, connections of existing sewers with intercepting sewers, branch drains, sewers or drains in any street where one thereof only shall have been built, and the necessary connections aforesaid.

The supreme judicial and superior courts may enforce this section.

#### Section 97

SECTION 97. If any apportionment for assessment upon the towns of either the metropolitan water, sewerage or park districts shall not have been finally determined by July first of any year, the last apportionment thereof shall remain in force for the purpose of assessment during such current year. Any difference between such apportionment when finally made by the commission for such year, and the pre-existing apportionment above referred to, shall be adjusted with such town by the state treasurer in the assessment of the succeeding year by a deduction therefrom or an addition thereto, as may be required to give effect to the said apportionment when made as aforesaid.

#### Section 98

Annual appropriations shall be made for the maintenance of reservations and boulevards, of the north and south metropolitan systems of sewerage, and of the metropolitan water system under the control of the commission, and such appropriations shall be apportioned and assessed by the state treasurer as provided in this chapter. Of the amount so assessed and collected, any balance remaining on November thirtieth in any year shall be carried forward to the next year, and shall be taken into account in making the assessments for that year.



## CHAPTER 705

### Section 12

The metropolitan district commission is hereby authorized and directed to adopt, and thereafter may alter, amend and repeal, rules and regulations concerning the discharge of sewage, drainage, substances or wastes into any sewer under its control, or any sewer tributary thereto, within the north metropolitan sewerage district or the south metropolitan sewerage district. Failure on the part of any municipality within either of said districts to comply with any such rule or regulation, or with any order made under authority thereof, lawfully affecting such municipality, shall be sufficient cause for the levying and collecting by said metropolitan district commission from such municipality of such additional assessment or assessments as said metropolitan district commission may deem necessary to compensate it for the disposal of sewage, drainage, substances or wastes from such municipality; provided, that no such additional assessment shall be levied on any such municipality in any one year which shall exceed the sum of an amount equal to one twentieth of one per cent of the taxable value of such municipality, or the sum of two hundred thousand dollars.

*Section 13.* The metropolitan district commission shall, upon the completion by the city of Boston of the sewage treatment plant of the Boston main drainage system, dispose of the sludge from said treatment plant.